Oliver Lodge

Sir Oliver Lodge

Vanity Fair cartoon.

Born	Oliver Joseph Lodge Penkhull, Staffordshire
Died	22 August 1940 (aged 89) Lake, Wiltshire
Occupation	Physicist and inventor
Influenced	Charles Glover Barkla

Sir Oliver Joseph Lodge, FRS[1] (12 June 1851 – 22 August 1940) was a British physicist and writer involved in the development of key patents in wireless telegraphy.[2] In his 1894 Royal Institution lectures ("*The Work of Hertz and Some of His Successors*"), Lodge coined the term "coherer" for the device developed by French physicist Édouard Branly based on the work of Italian physicist Temistocle Calzecchi Onesti. In 1898 he was awarded the "syntonic" (or tuning) patent by the United States Patent Office. He was also credited by Lorentz (1895)[3] with the first published description of the length contraction hypothesis, in 1893, though in fact Lodge's friend George Francis FitzGerald had first suggested the idea in print in 1889.[4]

Life

Oliver Lodge was born in 1851 at Penkhull in what is now Stoke-on-Trent, and educated at Adams' Grammar School, Newport, Shropshire. He was the eldest of eight sons and a daughter of Oliver Lodge (1826–1884) - later a ball clay merchant[5] at Wolstanton, Staffordshire - and his wife, Grace, née Heath (1826–1879).[6] Sir Oliver's siblings included Sir Richard Lodge (1855–1936), historian; Eleanor Constance Lodge (1869–1936), historian and principal of Westfield College, London; and Alfred Lodge (1854–1937), mathematician.

In 1865, Lodge, at the age of 14, entered his father's business (Oliver Lodge & Son) as an agent for B. Fayle & Co selling Purbeck blue clay to the potteries, travelling as far as Scotland. He continued to assist his father until he reached the age of 22. His father's wealth obtained from selling Purbeck ball clay enabled Lodge to attend physics lectures in London and attend the local Wedgwood Institute.

Lodge obtained a Bachelor of Science degree from the University of London in 1875 and a Doctor of Science in 1877. He was appointed professor of physics and mathematics at University College, Liverpool in 1881. In 1900 Lodge moved from Liverpool back to the Midlands and became the first principal of the new Birmingham University, remaining there until his retirement in 1919. He oversaw the start of the move of the university from Edmund Street in the city centre to its present Edgbaston campus. Lodge was awarded the Rumford Medal of the Royal Society in 1898 and was knighted by King Edward VII in 1902. In 1928 he was made Freeman of his native city, Stoke-on-Trent.

Lodge married Mary Fanny Alexander Marshall at St George's church, Newcastle-under-Lyme in 1877. They had twelve children, six boys and six girls: Oliver William Foster (1878–1955), Francis Brodie (1880–1967), Alec (1881–1938), Lionel (1883–1948), Noel (1885–1962), Violet (1888–1924), Raymond (1889–1915), Honor (1891–1979), Lorna (1892–1987), Norah (1894–1990), Barbara (1896–1983), and Rosalynde (1896–1983). Four of his sons went into business using Lodge's inventions. Brodie and Alec created the Lodge Plug Company, which manufactured sparking plugs for cars and aeroplanes. Lionel and Noel founded a company that produced an electrostatic device for cleaning factory and smelter smoke in 1913, called the Lodge Fume Deposit Company Limited (changed in 1919 to Lodge Fume Company Limited and in 1922, through agreement with the International Precipitation Corporation of California, to Lodge Cottrell Ltd). Oliver, the eldest son, became a poet and author.

After his retirement in 1920, Sir Oliver and Lady Lodge settled in Normanton House, near Lake in Wiltshire, just a few miles from Stonehenge. Lodge and his wife are buried at St. Michael's Church, Wilsford (Lake), Wiltshire.[7] Their eldest son Oliver and eldest daughter Violet are buried at the same church.

Accomplishments

Maxwell's "*Treatise on Electricity and Magnetism*" appeared in 1873 and by 1876 Lodge was studying it intently. But he was fairly limited in mathematical physics both by aptitude and training and his first two papers were a description of a mechanism (of beaded strings and pulleys) that could serve to illustrate electrical phenomena such as conduction and polarization. Indeed, Lodge is probably best known for his advocacy and elaboration of Maxwell's aether theory - a later deprecated model postulating a wave-bearing medium filling all space. He explained his views on the aether in "*Modern Views of Electricity*" (1889) and continued to defend those ideas well into the twentieth century ("*Ether and Reality*", 1925).

As early as 1879 Lodge became interested in generating (and detecting) electromagnetic waves, something Maxwell had never considered. This interest continued throughout the 1880s but three obstacles slowed Lodge's progress. First, he thought in terms of generating light waves with their very high frequencies rather than radio waves with their much lower frequencies. Second, his good friend George FitzGerald (on whom Lodge depended for theoretical guidance) assured him (incorrectly) that "ether waves could not be generated electromagnetically.".[8] FitzGerald later corrected his error but by 1881 Lodge had assumed a teaching position at University College, Liverpool the demands of which limited his time and his energy for research. And so it was Heinrich Hertz in Germany who was the first to demonstrate the transmission of electromagnetic waves in 1888.

On 14 August 1894, at a meeting of the British Association for the Advancement of Science at Oxford University, Lodge gave a lecture on the work of Hertz (recently deceased) and transmitted radio signals to demonstrate their potential for communication.[9] This was one year before Marconi but one year after Tesla did the same thing. On 25 June 1995, the Royal Society recognized this scientific achievement at a special ceremony at Oxford University.[10] In 1894 he attempted to detect radio emission from the Sun, but his apparatus was not sensitive enough and the experiment would have been ruined by electrical interference from Liverpool in any case.[11]

Lodge improved Edouard Branly's coherer radio wave detector by adding a "trembler" which dislodged clumped filings, thus restoring the device's sensitivity. He worked with Alexander Muirhead on the development of wireless telegraphy, selling their patents to Marconi in 1912. Lodge also carried out scientific investigations on lightning, the source of the electromotive force in the voltaic cell, electrolysis, and the application of electricity to the dispersal of

fog and smoke.

Lodge also made a major contribution to motoring when he patented a form of electric spark ignition for the internal combustion engine (the Lodge Igniter). Later, two of his sons developed his ideas and in 1903 founded Lodge Bros, which eventually became known as Lodge Plugs Ltd. He also made discoveries in the field of wireless transmission. In 1898, Lodge gained a patent on the moving-coil loudspeaker, utilizing a coil connected to a diaphragm, suspended in a strong magnetic field.[12] His "syntonic" tuner patent[2] allowed the frequency of transmitter and receiver to be "verified with ease and certainty". This was a basic patent in the industry, unusually recognized as such when extended, and purchased and used by the Marconi Company.

Raymond Lodge (1889–1915)

In political life, Lodge was an active member of the Fabian Society and published two Fabian Tracts: Socialism & Individualism (1905) and co-authored Public Service versus Private Expenditure with Sidney Webb, George Bernard Shaw and Sidney Ball. They invited him several times to lecture at the London School of Economics.

Lodge is also remembered for his studies of life after death. He first began to study psychical phenomena (chiefly telepathy) in the late 1880s, was a member of the Ghost Club and served as president of the London-based Society for Psychical Research from 1901 to 1903. After his son, Raymond, was killed in World War I in 1915, Lodge visited several mediums and wrote about the experience in a number of books, including the best-selling "Raymond, or Life and Death" (1916). The parallel with fellow Ghost Club member Arthur Conan Doyle, who also lost a son in World War I and turned to spiritualism is striking. Altogether, Lodge wrote more than 40 books, about the afterlife, aether, relativity, and electromagnetic theory.

In 1889 Lodge was appointed President of the Liverpool Physical Society, a position he held until 1893. The society still runs to this day, though under a student body.

Tributes

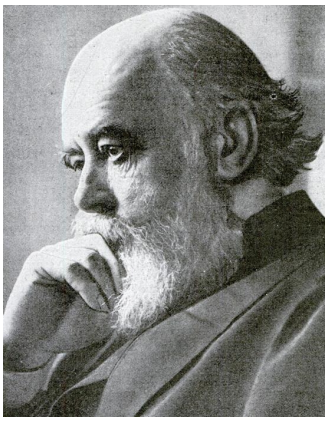
The author of his obituary in *The Times* wrote:

Always an impressive figure, tall and slender with a pleasing voice and charming manner, he enjoyed the affection and respect of a very large circle…

Lodge's gifts as an expounder of knowledge were of a high order, and few scientific men have been able to set forth abstruse facts in a more lucid or engaging form… Those who heard him on a great occasion, as when he gave his Romanes lecture at Oxford or his British Association presidential address at Birmingham, were charmed by his alluring personality as well as impressed by the orderly development of his thesis. But he was even better in informal debate, and when he rose, the audience, however perplexed or jaded, settled down in a pleased expectation that was never disappointed.[13]

Oliver Lodge Primary School in Vanderbijlpark, South Africa is named in his honour.

Historical records


Sir Oliver Joseph Lodge

Sir Oliver Lodge's letters and papers were divided after his death. Some were deposited at the University of Birmingham and University of Liverpool and others at the Society for Psychical Research and the University College London. Lodge was long-lived and a prolific letter writer and other letters of his survive in the personal papers of other individuals and several other universities and other institutions. Among the known collections of his papers are the following:

- The University of Birmingham Special Collections holds over 2000 items of Sir Oliver's correspondence relating to family, co-workers at Birmingham and Liverpool Universities and also from numerous religious, political and literary figures. The collection also includes a number of Lodge's diaries, photographs and newscuttings relating to his scientific research and scripts of his published work. There are also an additional 212 letters of Sir Oliver Lodge which have been acquired over the years (1881–1939).
- The University of Liverpool holds some notebooks and letters of Oliver Lodge and also has a laboratory named after him, the main administrative centre of the Physics Department where the majority of lecturers and researchers have their offices.
- University College London Special Collections hold 1991 items of Sir Oliver Lodge's correspondence between 1871 and 1938.
- The Society for Psychical Research holds 2710 letters written to Oliver Lodge.
- Devon Record Office holds Lodge's letters to Sir Thomas Acland (1907–1908).
- The University of Glasgow Library holds Sir Oliver's letters to William Macneile Dixon (1900–1938).
- The University of St Andrews has twenty-three letters from Sir Oliver to Wilfred Ward (1896–1908).
- Trinity College Dublin is custodian of Lodge's correspondence with John Joly.
- Imperial College, London Archives hold nineteen letters Lodge wrote to his fellow scientist, Silvanus Thompson.
- The London Science Museum holds an early notebook of Oliver Lodge's dated 1880, correspondence dating from 1894–1913 and a paper on atomic theory.

Books

- *Pioneers of Science* [14], 1893
- *The Work of Hertz and Some of His Successors*, 1894 (after *Signalling Through Space Without Wires*, 1900)
- *Electric Theory of Matter* [15]. Harper's Magazine. 1904. (O'Neill's Electronic Museum)
- *Life and Matter* [16], 1905
- *The substance of faith allied with science. A catechism for parents and teachers* [17], 1907
- *Electrons, or The Nature and Properties of Negative Electricity*, 1907
- *Man and the Universe*, 1908
- *Survival of Man*, 1909
- *The Ether of Space*, May,1909. ISBN 1-4021-8302-X (paperback), ISBN 1-4021-1766-3 (hardcover)
- *Reason and Belief*, 1910. Book Tree. February 2000. ISBN 1-58509-226-6
- *Modern Problems*, 1912
- *Science and Religion*, 1914
- *The War and After*, 1915
- *Raymond, or Life and Death*, 1916
- *Christopher*, 1918

- *Raymond Revised*, 1922
- *The Making of Man*, 1924
- *Ether and Reality*, 1925. ISBN 0-7661-7865-X
- *Relativity - A very elementary exposition*. Paperback. Methuen & Co. Ltd. London. 11 June 1925
- *Talks About Wireless*, 1925
- Ether, *Encyclopædia Britannica*, Thirteenth Edition, 1926
- *Evolution and Creation*, 1926
- *Science and Human Progress*, 1927
- *Modern Scientific Ideas*. Benn's Sixpenny Library No. 101, 1927
- *Why I Believe in Personal Immortality*, 1928
- *Phantom Walls*, 1929
- *Beyond Physics, or The Idealization of Mechanism*, 1930
- *The Reality of a Spiritual World*, 1930
- *Conviction of Survival*, 1930
- *Advancing Science*, 1931
- *Past Years: An Autobiography*. Charles Scribner's Sons, 1932
- *My Philosophy*, 1933

References

[1] Gregory, R. A.; Ferguson, A. (1941). "Oliver Joseph Lodge. 1851-1940". *Obituary Notices of Fellows of the Royal Society* **3** (10): 550. doi:10.1098/rsbm.1941.0022.

[2] Lodge, (1898). *Improvements in Syntonized Telegraphy without Line Wires*. British Patent Office.

[3] Lorentz, H. A. (1895) "Michelson's Interference Experiment" (reprinted in *The Principle of Relativity*, Dover, 1952, page 4)

[4] Lodge, Oliver "Aberration Problems", *Phil. Trans. Roy. Soc.* 184 (1893)

[5] Purbeck Blue Clay, as it was then known, according to (http://www.pmmmg.org/History.htm).

[6] Oliver and Grace Lodge are buried in St. Thomas Church Yard, Penkhull according to this web site (http://www.thepotteries.org/focus/003.htm).

[7] For a photo of his gravesite, see "Sir Oliver Joseph Lodge" (http://web.archive.org/web/20080621123653/http://people.clarkson.edu/~ekatz/scientists/lodge.html). Archived from the original (http://people.clarkson.edu/~ekatz/scientists/lodge.html) on 2008-06-21. . Retrieved 2008-07-01.

[8] Hunt, Bruce J. 2005. The Maxwellians. Ithaca: Cornell University Press, p. 37.

[9] Lodge, Oliver J (1932). *Past Years: An Autobiography*, New York: Charles Scribner's Sons, page 231.

[10] Present at the ceremony were three of Lodge's grandsons, Oliver Raymond Wynlane Lodge, Thomas Odoard Marshall Lodge, and Colin William Uppington Lodge; three of his great grandsons, Brodie Barton Odoard Lodge, Owen Barnaby Lodge and David John Angelo Trotman; the President of the Royal Society, Sir Michael Atiyah; Dr Peter Rowlands and Dr J. Patrick Wilson.

[11] Hey, J. S. (1973). *The Evolution of Radio Astronomy*. Histories of Science Series. **1**. Paul Elek (Scientific Books).

[12] Lodge, (1898). British Patent 9,712/98.

[13] Obituary in *The Times*, Friday 23 August 1940 (page 7, column 4)

[14] http://www.gutenberg.org/ebooks/28613

[15] http://www.oneillselectronicmuseum.com/page40.html

[16] http://www.gutenberg.org/ebooks/26321

[17] http://www.archive.org/details/thesubstanceoffa00lodgiala

Notable relatives

- Fiona Godlee, physician and editor (great-granddaughter)
- Percy John Heawood, mathematician (cousin)
- Alexander Lodge, inventor (son)
- Carron O Lodge, artist
- Eleanor Constance Lodge, historian (sister)
- Francis Graham Lodge, artist
- George Edward Lodge, artist (cousin)
- Oliver W F Lodge, poet and author (son)
- Sir Richard Lodge, historian (brother)
- Samuel Lodge, clergyman & author (uncle)
- Tom Lodge, author & radio broadcaster (grandson)
- David Trotman, mathematician (great-grandson)

External links

- Works by Oliver Lodge (http://www.gutenberg.org/author/Oliver_Lodge) at Project Gutenberg
- Painted portrait of Sir Oliver Lodge by Sir [[George Reid (http://www.npg.org.uk/collections/search/portrait/mw03977/Sir-Oliver-Joseph-Lodge?LinkID=mp02780&search=sas&sText=oliver+lodge&role=sit&rNo=0)] at the National Portrait Gallery, London]
- Interactive Java Tutorial - Lodge's experiment demonstrating the first tunable radio receiver (http://www.magnet.fsu.edu/education/tutorials/java/lodgeexperiment/index.html) National High Magnetic Field Laboratory
- U.S. Patent 609,154 (http://www.google.com/patents?vid=609154), "*Electric Telegraphy*" (wireless telegraphy using Ruhmkorff or Tesla coil for transmitter and Branly coherer for detector, the "syntonic" tuning patent) August, 1898. Sold to Marconi in 1912.
- " *Oliver Joseph Lodge, Sir* (http://pandora.nla.gov.au/pan/13071/20040303-0000/www.acmi.net.au/AIC/LODGE_BIO.html)*: 1851 - 1940*". Adventures in CyberSound.
- Death of Sir Oliver Lodge (http://articles.adsabs.harvard.edu/full/seri/JRASC/0034//0000435.000.html?high=46ba644da526932) - *Journal of the Royal Astronomical Society of Canada*, Vol. 34, pages 435 - 436.
- " *Sir Oliver Lodge* (http://www.fst.org/lodge.htm) *1851-1940*". First Spiritual Temple. 2001.
- University of Birmingham Staff Papers: Papers of Sir Oliver Lodge (http://www.archiveshub.ac.uk/news/03011701.html)'
- The Potteries Museum & Art Gallery (http://www.stoke.gov.uk/museums), in Stoke-on-Trent, UK, features a display about local hero Oliver Lodge (http://www.stoke.gov.uk/ccm/museums/museum/2006/collections/local-history/information-sheets/potteries-people/oliver-lodge.en) and his pioneering 1907 igniter (http://www.stoke.gov.uk/ccm/museums/museum/2006/collections/local-history/information-sheets/lodge-igniter/lodge-igniter.en), forerunner of the spark plug.
- A collection of portraits of Sir Oliver Lodge at the National Portrait Gallery, London (http://www.npg.org.uk/live/search/person.asp?search=ss&sText=lodge&LinkID=mp02780)
- Lodge-Cottrell Ltd (http://www.lodgecottrell.com/)

Chisholm, Hugh, ed. (1911). "Lodge, Sir Oliver Joseph". *Encyclopædia Britannica* (11th ed.). Cambridge University Press.

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